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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/811,063	03/16/2001	Joe A. Harrison	INTL-0519-US (P10729)	7275

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EXAMINER

TRAN, THANH Y

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/811,063

Applicant(s)

JOE A. HARRISON

Examiner

Thanh Y. Tran

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6,8-37 and 39-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6,8-37 and 39-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3 and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Middlehurst et al (U.S. 6,402,566).

As to claim 1, Middlehurst et al discloses in figures 1-3, a circuit board (36, Fig. 2) comprising: a substrate; and electrical contacts (46a and 46b, Fig. 2) to mate with a slot connector (connector 61 comprising slot/recess 73, Fig. 2), the contacts comprising a first set of at least three uniformly spaced contacts (see the at least three uniformly spaced adjacent contacts 46a as shown in figure 2) to communicate power and a second set of at least three uniformly spaced contacts (see the at least three uniformly spaced adjacent contacts 46b as shown in figure 2) to communicate signals and not to communicate power, adjacent contacts (46a, Fig. 2) of the first set being separated by a first distance and adjacent contacts (46b, Fig. 2) of the second set being separated by a second distance different from the first distance wherein no intervening contact exists between any two adjacent contacts of the first set (46b, Fig. 2).

As to claim 3, Middlehurst et al discloses in figures 1-3, the substrate (36) comprises an edge to be inserted into a slot (recess 73) connector housing (61), and the first and second set of contacts (46a, 46b) are formed on the edge.

As to claim 5, Middlehurst et al discloses in figures 1-3, a circuit board (36, Fig. 2) further comprising power regulation circuitry mounted on the substrate and in electrical communication with the first set of contacts (46a) to regulate voltages provided by the first set of contacts (46a) and not regulate any voltages provided by the second set of contacts (46b) (see col. 3, lines 35-49).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Middlehurst et al (U.S. 6,402,566) in view of Woychik (U.S. 5,629,839), and Creswick (U.S. 6,191,022).

As to claims 2 and 4, Middlehurst et al discloses all limitations in figures 1-2 as applied above in claim 1, except for the first distance is approximately half of the second distance; wherein the first distance is approximately 0.05 inches and the second distance establishes a pitch of approximately 0.10 inches. It is well known to use the range of 0.05 inches and 0.10 inches for the first and second distance of contacts because they are standard sized pitches (see Creswick's reference, col. 1, line 65 - col. 2, line 10). Furthermore, Woychik discloses in figures 8 and 9, a printed circuit board (module 150) including the first set of contacts (152) having the first distance is approximately half of the second distance of the second set of contacts (160). Therefore, it would have been obvious to a person having ordinary skill in the art at the

time the invention was made to modify the circuit board of Middlehurst et al by making the standard pitches of 0.05 and 0.01 inches for the first and second distance of contacts (see Creswick's reference, col. 1, line 65 - col. 2, line 10), and the first distance of first set is approximately half of the second distance of second set as taught by Woychik for the purpose of matching the first and second set of contacts of the circuit board (figure 8) with the corresponding connecting pitches/sizes of the socket/connector (as shown in figure 9 of Woychik) and also reducing the parasitic inductance associated with the interconnection of the circuit board (module) and the motherboard (see the ABSTRACT of Woychik's reference). Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

5. Claims 6, 9-12, 14, 31-32, and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Middlehurst et al (U.S. 6,402,566) in view of Dranchak et al (U.S. 4,892,487).

As to claims 6 and 11, Middlehurst et al discloses in figures 1-3, a circuit board (36, Fig. 2) and a corresponding method comprising circuitry; and a substrate supporting the circuitry and having a contact edge to be inserted into a slot (recess 73) of a slot connector housing assembly (61).

Middlehurst et al does not teach the substrate having an edge profile engaged by the connector housing assembly inside the slot to resist removal of the circuit board from the slot connector housing assembly. Dranchak et al teaches the substrate (13, Figs. 1, 4 and 5) having an edge profile (see elements 31 and 109) engaged by the connector housing assembly (21)

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inside the slot to resist removal of the circuit board (13) from the slot (27) connector housing assembly (see col. 8, lines 10-55). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the substrate of Middlehurst et al by providing an edge profile as taught by Dranchak et al for securing the substrate within the connector housing assembly (see Figs. 1, 4 and 5, and col. 8, lines 10-55 in Dranchak's reference).

As to claims 9-10, 12 and 34, Middlehurst et al discloses all limitations in figures 1-3 as applied in claim 6 and a corresponding method, except for the profile comprises a notch formed in a straight edge of the substrate, the substrate edge being different from the contact edge and being inserted into the slot to position the edge profile to engage the connector housing assembly; and wherein the straight edge extends in an orthogonal direction to the contact.

Dranchak et al teaches in figures 1, and 4-5, a profile (see elements 31 and 109, Fig. 1) comprises a notch (109) formed in a straight edge of the substrate (13), the substrate edge being different from the contact edge and being inserted into the slot (27, Figs. 4-5) to position the edge profile to engage the connector housing assembly (21); wherein the straight edge extends in an orthogonal direction to the contact. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the substrate of Middlehurst et al by providing a profile comprising a notch formed in a straight edge of the substrate as taught by Dranchak et al for securing the substrate within the connector housing assembly (see Figs. 1, 4 and 5, and col. 8, lines 10-55 in Dranchak's reference).

As to claim 14, Middlehurst et al discloses in figures 1-3, a circuit board (36, Fig. 2) and a corresponding method, except for the step of forming the profile on a second edge of the

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substrate, the second edge extending in a direction substantially orthogonal to a direction along which the contact edge extends. Dranchak et al teaches in figures 1, and 4-5, forming the profile (see elements 31 and 109, Fig. 1) on a second edge of the substrate (13), the second edge extending in a direction substantially orthogonal to a direction along which the contact edge extends. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the substrate of Middlehurst et al by forming a profile on a second edge of the substrate as taught by Dranchak et al for securing the substrate within the connector housing assembly (see Figs. 1, 4 and 5, and col. 8, lines 10-55 in Dranchak's reference).

Claims 31 and 35 recites limitations similar to claims 6 and 9. Therefore, they are rejected for the same reasons.

As to claims 32 and 36, Middlehurst et al discloses all limitations in figures 1-3 as applied in claim 6, 9 and 31 and 35, except for the profile is engaged by mechanism located at least partially inside the slot. Dranchak et al teaches the profile (see elements 31 and 109) is engaged by mechanism (111) located at least partially inside the slot. Therefore it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the circuit board of Middlehurst et al by including a profile is engaged by mechanism located at least partially inside the slot as taught by Dranchak et al for securely retaining the edge of the circuit board inside the connector housing.

6. Claims 8, 13, 33 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Middlehurst et al (U.S. 6,402,566) in view of Dranchak et al (U.S. 4,892,487) as applied above in claim 6, and further in view of Dell et al. (U.S. 6,097,883).

As to claims 8, 13, 33 and 37, Middlehurst et al does not teach a connector housing comprising a plastic latch. Dranchak et al teaches in figure 1, a latch (tab 111) located inside the connector housing (21). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the connector housing of Middlehurst et al by including a latch located inside the connector housing as taught by Dranchak et al for securely retaining the edge of the printed circuit inside the slot of the connector housing. Middlehurst et al and Dranchak et al do not teach the latch is made of plastic material. It would also have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the teaching of Middlehurst et al and Dranchak et al by using plastic material for a latch for reducing the production cost, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Middlehurst et al and Dranchak do not that mechanism comprises at least one of a spring located entirely inside the connector housing. Dell et al discloses a circuit board (Fig. 8, element 10) wherein the mechanism (52) comprises at least one of a spring (58) located entirely inside the connector housing (see col. 6, lines 1-15). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the connector housing of Middlehurst et al and Dranchak by including at least one of a spring as taught by Dell et al, for flexibility holding/retaining the substrate within the slot connector housing assembly.

7. Claims 15-16, and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dell et al (U.S. 6,097,883) in view of Pope et al (U.S. 6,135,781).

As to claims 15 and 18, Dell et al teaches a connector (Fig. 8, element 52) and a corresponding method comprising: a housing (54) including a slot (56) to receive a circuit board (10), the housing (54); and electrical contacts secured to the housing (54) to establish electrical communication with electrical contact pads (18, 20) of the circuit board (10) (see Fig. 8, col. 6, lines 1-25).

Dell et al. is silent teaching the housing being formed from a material having a thermal conductivity of at least approximately 0.27 W/m-K. However, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to provide a housing which is formed from a material (liquid crystal polymer such as Zenite) having a thermal conductivity of at least approximately 0.27 W/m-K in the prior art of Dell et al. Pope et al teaches a housing (connector) comprising a material of Zenite (see col. 57, lines 1-21). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the prior art of Dell et al by using a material of Zenite (which is inherently having the same thermal conductivity and *approximately* 0.27 W/m-K) for making the connector housing as taught by Pope et al. Because such motivation would prevent the disadvantage of high thermal conductivity which may damage to the circuitry of circuit board.

As to claims 16 and 19, Dell et al teaches the material of connector and a corresponding method comprising a liquid crystal polymer (plastic) (see col. 6, lines 1-15).

8. Claims 17, 20-24, 39 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dell et al. (U.S. 6,097,883) in view of Pope et al (U.S. 6,135,781) as applied above in claim 15 and further in view of Volz et al. (U.S. 5,353,191).

As to claims 17, 20, 24 and 40, Dell et al and Pope et al do not teach the housing (connector) and a corresponding method comprising forming fins in the housing to conduct heat away from the circuit board; and forming the fins out of a liquid crystal polymer. Volz et al teaches a housing (10, Fig. 1) comprising fins (20) to promote conduction of heat away from the circuit board (see col. 3, line 60 – col. 4, line 16); and forming the fins out of a liquid crystal polymer. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the housing of Dell et al and Pope et al by including fins as taught by Volz et al for the purpose of releasing heat from the circuit board.

Claims 21-22 and 39 recite limitations similar to claims 18-20. Therefore, they are rejected for the same reasons.

As to claim 23, Dell et al, Pope et al, and Volz et al do not teach each of the clearances is in a range between approximately $\frac{1}{4}$ inches and approximately $\frac{3}{8}$ inches. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the circuit board of Dell et al, Pope et al, and Volz et al by including each of the clearances is in a range between approximately $\frac{1}{4}$ inches and approximately $\frac{3}{8}$ inches for the intended use, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to claim 41, Dell et al teaches a connector (Fig. 8, element 52) further comprising a retention mechanism (58) located partially inside the housing (52) to engage the circuit board (10) to resist removal of the circuit board from a housing (52).

9. Claims 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dell et al. (U.S. 6,097,883) in view of Dranchak et al (U.S. 4,892,487).

As to claims 25-26 and 28-29, Dell et al discloses in figure 8, a slot connector and a corresponding method comprising: a electrical contacts (58, 60) to establish electrical communication with electrical contacts ("pads" on edge 20) of a circuit board; a housing (52) comprising a slot to receive the electrical contacts ("pads" on edge 20). Dell et al does not teach a retention mechanism to engage an edge profile of the circuit board inside the slot to secure the circuit board to the slot connector; and wherein the retention mechanism is located entirely inside the slot. Dranchak et al teaches in figures 1, and 4-5, a retention mechanism (111, Fig. 1) to engage an edge profile (see elements 31 and 109) of the circuit board (13) inside the slot (27, Figs. 4-5) to secure the circuit board to the slot connector; and wherein the retention mechanism (111) is located entirely inside the slot. Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the substrate of Dell et al by forming a retention mechanism to engage an edge profile of the circuit board as taught by Dranchak et al for securing the circuit board within the connector housing assembly (see Figs. 1, 4 and 5, and col. 8, lines 10-55 in Dranchak's reference).

As to claim 27, figure 8 of Dell et al shows the retention mechanism (58) comprises a spring (see col. 6, lines 1-5).

As to claim 30, figure 8 of Dell et al shows the retention mechanism (58) comprises at least one of a spring (see col. 6, lines 1-5). Dell et al does not teach a retention mechanism comprising a plastic latch. Dranchak et al teaches retention mechanism comprising a latch (tab 111). Therefore it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the connector housing of Dell et al by including a latch as taught by Dranchak et al for securely retaining the edge of the circuit board inside the connector housing. Dell et al and Dranchak et al do not teach a latch is made of plastic material. It would also have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the teaching of Dell et al and Dranchak et al by including a latch which is made by plastic material for reducing the production cost, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Noschese (U.S. 5,709,555) teaches High Density card edge Connection System with Outtrigger and Sequentially Connected contacts.


Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh Y. Tran whose telephone number is (571) 272-2110. The examiner can normally be reached on Monday through Thursday and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo, can be reached on (571) 272-1957. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3431.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

TYT


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